

## **Claims**

We claim:

1. A lateral N-channel DMOS transistor formed in a P-type semiconductor substrate, said substrate not comprising an epitaxial layer, said transistor comprising:
  - 5 a field oxide layer partially covering the surface of said substrate;
  - a gate overlying said substrate, said gate comprising a first portion at a first end of said field oxide layer and separated from said substrate by a gate oxide layer and a second portion stepped up and overlying at least a portion of said field oxide layer;
  - an N-type source region formed at said surface of said substrate and located at one  
10 side of said first portion of said gate;
  - a P-type body region having a junction with said source region and including a channel region underlying said first portion of said gate, said body region being electrically connected to said source region;
  - an N-type drain region located at said surface of said substrate near a second end  
15 of said field oxide layer, said drain region having a first average doping concentration of N-type dopant; and
  - a drift region located at least partially under said field oxide layer and extending between said body region and said N well, said drift region having a second average doping concentration of N-type dopant;
  - 20 wherein said drift region has a peak doping concentration within said substrate below said surface and a surface doping concentration at said surface that is lower than said peak concentration; and
  - wherein said first average doping concentration is greater than said second average doping concentration.